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Notice of Allowability

Application No.

10/644,071

Applicant(s)

SASAKI ET AL.

Examiner

John H. Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicant's amendment filed 05/27/2005.
2. ☒ The allowed claim(s) is/are 2-16, 18-24, 26-32, 34-40 and 42-53.
3. ☒ The drawings filed on 09 December 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

Response to Amendment

1. Applicant's amendment filed 05/27/2005 has been entered and carefully considered.

Claims 2-16, 18-24, 26-32, 34-40, 42-48 has been amended.

Claims 1, 17, 25, 33, and 41 have been cancelled.

Claims 49-53 have been added.

Reasons for Allowance

2. Claims 2-16, 18-24, 26-32, 34-40, and 42-53 are allowed.
3. The following is a statement of reasons for the indication of allowable subject matter:

Please see the previous office action and applicant's argument filed on 12/27/2004 and 05/27/2005.

In combination with other limitations of claims, the cited prior arts fail to teach a pad scanning unit for scanning the surface shape of said contact pad in surface shape; a part extracting unit for differentiating the read surface shape to extract a multiplicity of flat parts; a reference generating unit for complementing the multiplicity of extracted flat parts to generate a reference shape; a recess detecting unit for subtracting said generated reference shape from the read surface shape to detect a plurality of recesses having a predetermined depth or more; a recess selecting unit for selecting one from the plurality of detected recesses corresponding to reference information; an impression detecting unit for subtracting said reference shape from the read surface shape at the position of the selected recess to detect an impression of said contact probe; a shape

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detecting unit for detecting at least one of a depth, a position and a shape of the detected impression; and a probe determining unit for determining from at least one of the detected depth, position and shape of the impression whether said contact probe is acceptable or defective, as recited in amended claim(s) 2. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a probe imaging unit for imaging the end shape of said contact probe from an axial direction to read three-dimensional data of the end shape; a cross-section detecting unit for detecting a cross-sectional area of said contact probe at a predetermined position thereof from the imaged end shape; and a probe determining unit for determining whether said contact probe is acceptable or defective depending on whether or not the detected cross-sectional area falls within a predetermined tolerance range., as recited in amended claim(s) 6. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a probe imaging unit for imaging an end shape of said contact probe from the axial direction to read three-dimensional data of the end shape; a flat part detecting unit for detecting a flat part perpendicular to the axial direction from the imaged end shape; a curvature detecting unit for sequentially detecting

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curvatures along a contour of the detected flat part; a fragment detecting unit for detecting a fragmentary length of the contour over which the detected curvature falls within a predetermined abnormal range; and a probe determining unit for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of a total of the detected fragmentary lengths to the overall length of the contour falls within a predetermined tolerance range, as recited in amended claim(s) 8. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a probe imaging unit for imaging an end shape of said contact probe from the axial direction to read three-dimensional data of the end shape; a flat part detecting unit for detecting a flat part perpendicular to the axial direction from the imaged end shape; an area detecting unit for detecting the area of the detected flat part; a diameter detecting unit for detecting a maximum diameter of the detected flat part; an area calculating unit for calculating the area of the flat part from the detected diameter; and a probe determining unit for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of the detected area to the calculated area falls within a predetermined tolerance range, as recited in amended claim(s) 10. It is these limitations as they are claimed in the combination with other limitations of claim,

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which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a pad scanning step for scanning the surface shape of said contact pad in pressure contact with said contact probe to read three-dimensional data of the surface shape; a part extracting step for differentiating the read surface shape to extract a multiplicity of flat parts; a reference generating step for complementing the multiplicity of extracted flat parts to generate a reference shape; a recess detecting step for subtracting said generated reference shape from the read surface shape to detect a plurality of recesses having a predetermined depth or more; a recess selecting step for selecting one from the plurality of detected recesses corresponding to reference information; an impression detecting step for subtracting said reference shape from the read surface shape at the position of the selected recess to detect an impression of said contact probe; a shape detecting step for detecting at least one of a depth, a position and a shape of the detected impression; and a probe determining step for determining from at least one of the detected depth, position and shape of the impression whether said contact probe is acceptable or defective, as recited in amended claim(s) 18. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a probe imaging step for imaging the end shape of said contact probe from

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the axial direction to read three-dimensional data of the end shape; a cross-section detecting step for detecting a cross-sectional area of said contact probe at a predetermined position from the imaged end shape; and a probe determining step for determining whether said contact probe is acceptable or defective depending on the detected cross-sectional area falls within a predetermined tolerance range, as recited in amended claim(s) 20. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a probe imaging step for imaging an end shape of said contact probe from the axial direction to read three-dimensional data of the end shape; a flat part detecting step for detecting a flat part perpendicular to the axial direction from the imaged end shape; a curvature detecting step for sequentially detecting curvatures along a contour of the detected flat part; a fragment detecting step for detecting a fragmentary length of the contour over which the detected curvature falls within a predetermined abnormal range; and a probe determining step for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of a total of the detected fragmentary lengths to the overall length of the contour falls within a predetermined tolerance range., as recited in amended claim(s) 22. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or

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suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a probe imaging step for imaging an end shape of said contact probe from the axial direction to read three-dimensional data of the end shape; a flat part detecting step for detecting a flat part perpendicular to the axial direction from the imaged end shape; an area detecting step for detecting the area of the detected flat part; a diameter detecting step for detecting a maximum diameter of the detected flat part; an area calculating step for calculating the area of the flat part from the detected diameter; and a probe determining step for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of the detected area to the calculated area falls within a predetermined tolerance range, as recited in amended claim(s) 24. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a part extracting unit for differentiating the read surface shape to extract a multiplicity of flat parts; a reference generating unit for complementing the multiplicity of extracted flat parts to generate a reference shape; a recess detecting unit for subtracting said generated reference shape from the read surface shape to detect a plurality of recesses having a predetermined depth or more; a recess selecting unit for selecting one from the plurality of detected

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recesses corresponding to reference information; an impression detecting unit for subtracting said reference shape from the read surface shape at the position of the selected recess to detect an impression of said contact probe; a shape detecting unit for detecting at least one of a depth, a position and a shape of the detected impression; and a probe determining unit for determining from at least one of the detected depth, position and shape of the impression whether said contact probe is acceptable or defective., as recited in amended claim(s) 26. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a cross-section detecting unit for detecting a cross-sectional area of said contact probe at a predetermined position thereof from the end shape imaged from said contact probe as three-dimensional data; and a probe determining unit for determining whether said contact probe is acceptable or defective depending on whether or not the detected cross-sectional area falls within a predetermined tolerance range, as recited in amended claim(s) 28. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a flat part detecting unit for detecting a flat part perpendicular to the axial direction from the end shape imaged from said contact probe as three-

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dimensional data; a curvature detecting unit for sequentially detecting curvatures along a contour of the detected flat part; a fragment detecting unit for detecting a fragmentary length of the contour over which the detected curvature falls within a predetermined abnormal range; and a probe determining unit for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of a total of the detected fragmentary lengths to the overall length of the contour falls within a predetermined tolerance range, as recited in amended claim(s) 30. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a flat part detecting unit for detecting a flat part perpendicular to the axial direction from the end shape imaged from said contact probe as three-dimensional data; an area detecting unit for detecting the area of the detected flat part; a diameter detecting unit for detecting a maximum diameter of the detected flat part; an area calculating unit for calculating the area of the flat part from the detected diameter; and a probe determining unit for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of the detected area to the calculated area falls within a predetermined tolerance range, as recited in amended claim(s) 32. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a part extracting step for differentiating the read surface shape to extract a multiplicity of flat parts; a reference generating step for complementing the multiplicity of extracted flat parts to generate a reference shape; a recess detecting step for subtracting said generated reference shape from the read surface shape to detect a plurality of recesses having a predetermined depth or more; a recess selecting step for selecting one from the plurality of detected recesses corresponding to reference information; an impression detecting step for subtracting said reference shape from the read surface shape at the position of the selected recess to detect an impression of said contact probe; a shape detecting step for detecting at least one of a depth, a position and a shape of the detected impression; and a probe determining step for determining from at least one of the detected depth, position and shape of the impression whether said contact probe is acceptable or defective, as recited in amended claim(s) 34. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a cross-section detecting step for detecting a cross-sectional area of said contact probe at a predetermined position thereof from the end shape imaged from said contact probe as three-dimensional data; and a probe determining step for determining whether said contact probe is acceptable or defective depending on whether or not the detected cross-sectional area falls within a predetermined-

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tolerance range, as recited in amended claim(s) 36. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a flat part detecting step for detecting a flat part perpendicular to the axial direction from the end shape imaged from said contact probe as three-dimensional data; a curvature detecting step for sequentially detecting curvatures along a contour of the detected flat part; a fragment detecting step for detecting a fragmentary length of the contour over which the detected curvature falls within a predetermined abnormal range; and a probe determining step for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of a total of the detected fragmentary lengths to the overall length of the contour falls within a predetermined tolerance range, as recited in amended claim(s) 38. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach a flat part detecting step for detecting a flat part perpendicular to the axial direction from the end shape imaged from said contact probe as three-dimensional data; an area detecting step for detecting the area of the detected flat part; a diameter detecting step for detecting a maximum diameter of the detected flat part; an area calculating step for calculating the area of the flat part

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from the detected diameter; and a probe determining step for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of the detected area to the calculated area falls within a predetermined tolerance range, as recited in amended claim(s) 40. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach part extraction processing for differentiating the read surface shape to extract a multiplicity of flat parts; reference generation processing for complementing the multiplicity of extracted flat parts to generate a reference shape; recess detection processing for subtracting said generated reference shape from the read surface shape to detect a plurality of recesses having a predetermined depth or more; recess selection processing for selecting one from the plurality of detected recesses corresponding to reference information; impression detection processing for subtracting said reference shape from the read surface shape at the position of the teed-selected recess to detect an impression of said contact probe; shape detection processing for detecting at least one of a depth, a position and a shape of the detected impression; and probe determination processing for determining from at least one of the detected depth, position and shape of the impression whether said contact probe is acceptable or defective, as recited in amended claim(s) 42. It is these limitations as they are claimed in the combination with other limitations of claim, which have

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not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach cross-section detection processing for detecting a cross-sectional area of said contact probe at a predetermined position thereof from the end shape imaged from said contact probe as three-dimensional data; and probe determination processing for determining whether said contact probe is acceptable or defective depending on whether or not the detected cross-sectional area falls within a predetermined tolerance range, as recited in amended claim(s) 44. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach flat part detection processing for detecting a flat part perpendicular to the axial direction from the end shape imaged from said contact probe as three-dimensional data; curvature detection processing for sequentially detecting curvatures along a contour of the detected flat part; fragment detection processing for detecting a fragmentary length of the contour over which the detected curvature falls within a predetermined abnormal range; and probe determination processing for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of a total of the detected fragmentary lengths to the overall length of the contour falls within a

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predetermined tolerance range, as recited in amended claim(s) 46. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

In combination with other limitations of claims, the cited prior arts fail to teach flat part detection processing for detecting a flat part perpendicular to the axial direction from the end shape imaged from said contact probe as three-dimensional data; area detection processing for detecting the area of the detected flat part; diameter detection processing for detecting a maximum diameter of the detected flat part; area calculation processing for calculating the area of the flat part from the detected diameter; and probe determination processing for determining whether said contact probe is acceptable or defective depending on whether or not the ratio of the detected area to the calculated area falls within a predetermined tolerance range, as recited in amended claim(s) 48. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

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4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JL

John H. Le

Patent Examiner-Group 2863

June 8, 2005

BRYAN BUI
PRIMARY EXAMINER

Bryan Bui 6/10/05